

PATENT COOPERATION TREATY

TRANSLATION

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing (day/month/year) **see form PCT/ISA/210**

Applicant's or agent's file reference 56056		FOR FURTHER ACTION See paragraph 2 below
International application No. PCT/EP2010/060214	International filing date (day/month/year) 15.07.2010	Priority date (day/month/year) 16.07.2009
International Patent Classification (IPC) or both national classification and IPC H01M8/04, H01M8/06		
Applicant AVL LIST GMBH		

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/EP	Date of completion of this opinion	Authorized officer
Facsimile No.		Telephone No.

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Box No. I	Basis of this opinion
	<p>1. With regard to the language, this opinion has been established on the basis of:</p> <p><input checked="" type="checkbox"/> the international application in the language in which it was filed</p> <p><input type="checkbox"/> a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).</p> <p>2. <input type="checkbox"/> This opinion has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))</p> <p>3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:</p> <p>a. type of material</p> <p><input type="checkbox"/> a sequence listing</p> <p><input type="checkbox"/> table(s) related to the sequence listing</p> <p>b. format of material</p> <p><input type="checkbox"/> on paper</p> <p><input type="checkbox"/> in electronic form</p> <p>c. time of filing/furnishing</p> <p><input type="checkbox"/> contained in the international application as filed</p> <p><input type="checkbox"/> filed together with the international application in electronic form</p> <p><input type="checkbox"/> furnished subsequently to this Authority for the purposes of search</p> <p>4. <input type="checkbox"/> In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.</p> <p>5. Additional comments:</p>

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Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
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1. Statement			
Novelty (N)		Claims <u>1-6</u>	YES
		Claims _____	NO
Inventive step (IS)		Claims <u>1-6</u>	YES
		Claims _____	NO
Industrial applicability (IA)		Claims <u>1-6</u>	YES
		Claims _____	NO

2. Citations and explanations:

Reference is made to the following document:

D1: DE 10 2007 039593 A1 (AVL LIST GMBH [AT])
10 April 2008 (2008-04-10) cited in the application

D1 (DE 10 2007 039593) is considered to be the prior art closest to the subject matter of claim 1 and discloses

a method of operating a high-temperature fuel cell which in normal operation for the generation of electric power is supplied with liquid fuel, preferably diesel, and on the anode side has a reformer for the liquid fuel, where at least part of the hot anode offgas is recirculated via a return line to the anode circuit, the liquid fuel is sprayed or injected into the hot anode offgas upstream of a compressor located upstream of the reformer and the amount of air required for reforming of the liquid fuel is added to the mixture of anode offgas and fuel.

The subject matter of claim 1 therefore differs from the known method in that the supply of liquid fuel and air is stopped on changing from normal operation to a standby mode without generation of electric power and the gas

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Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

mixture present in the anode circuit is continually circulated and in that a defined amount of air is introduced, starting from standby operation, into the anode circuit in order to remove deposits and impurities in the high-temperature fuel cell, and is therefore novel (PCT Article 33(2)).

The problem addressed by the present invention can be considered that of removing deposits in standby operation of a high-temperature fuel cell anode.

The solution to this problem, as proposed in claim 1 of the present application, involves an inventive step (PCT Article 33(3)) for the following reasons:

Deposits (e.g. soot) in the anode are removed by introduction of a particular amount of air.

The indicated solution to the stated problem is not obvious to a person skilled in the art from the prior art.

Box No. VIII **Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

The application fails to comply with the requirements of PCT Article 6 because claims 1-6 are unclear.

1. Claims 3 and 6 do not meet the requirements of PCT Article 6 because the subject matter for which protection is sought is not clearly defined. The functional statements:

“the gas mixture present in the anode circuit is continually circulated” and “the return line for the anode offgas is closed” or “anode circuit ... is closed at the outlet end” are inconsistent with one another.

It is therefore not possible for a person skilled in the art to determine which technical features are necessary to carry out the stated function.

2. Claims 4 and 5 do not meet the requirements of PCT Article 6 because the subject matter for which protection is sought is not clearly defined. The functional statements:

“the gas mixture present in the anode circuit is continually circulated” and “the offgas recirculation rate of less than 100%” are inconsistent with one another.

It is therefore not possible for a person skilled in the art to determine which technical features are necessary to carry out the stated function.